WHAT IS CLAIMED IS:

1. A system for detecting a structural failure comprising:
a spindled cable;
multiple spindles anchored to a structure at an interval to ensure a cable break upon failure of the structure;
a signal source coupled to a cable; and
a signal detector coupled to a cable.

2. The system of claim 1, where the cable is fiber optic.

3. The system of claim 1, where the cable is pre-stretched to increase system sensitivity or increase distance between spindle anchor locations.

4. The system of claim 1, where a spindle set is used at each cable anchor location.

5. The system of claim 4, where the distance between spindles is adjustable to remove any slack from the cable.

6. The system of claim 5, where the cable is spindled such to produce no net cable twist.

7. The system of claim 5, where the cable is spindled such to produce no net spindle torque.

8. The system of claim 1, where the spindle surface has increased friction with the cable, comprised of at least one of the following:
an organic coating;
an encapsulation;
compression;
knurling;

teeth; or
a blade.

9. The system of claim 1, where the signal detector is coupled to one of the following user indicators:
a red traffic signal;
a railroad gate
a horn.

10. The system of claim 1, where multiple detection systems are placed in series.

11. The system of claim 1, with redundant detection systems.

12. The system of claim 11, where the signal carries a digital data signal and a controller coupled to a signal source and signal detector is operable to respond to diagnostic commands.

13. The system of claim 12, further comprising an independent backup power source for each signal source and detector.

14. The system of claim 12, where the system is coupled with off-site maintenance and emergency response services.

15. The system of claim 12, where the system provides information either automatically or by request via voice or data connection.

16. A system for detecting structural failure comprising;

a fiber optic cable coupled to a structure;

a multitude of alarm indicator controllers where at least one controller is located midspan of a structure where the controller monitors for a break in said fiber optic cable; and

at least one controller coupled to at least one user indicator.

17. The system of claim 16, further comprising an independent backup power source for each controller.

18. The system of claim 16, where the controller is operable to respond to diagnostic commands.

19. The system of claim 16, where the controller contains an inclinometer attached to the bridge structure.

20. A system for detecting structural failure comprising:
a means for attaching a fiber optic cable to a structure such that the cable failure indicates structural failure;
a means for anchoring said cable to said structure such that the cable will not slip or creep past an attachment point; and
a means for monitoring for a cable break.

21. The system of claim 20, where the means for attaching said cable to said structure will not allow more than 1 inch of slip or creep past the attachment point with said cable under continuous tension.

22. The system of claim 20, where the means of anchoring said cable to said structure includes one or more spindles.

23. The system of claim 22, where the spindle means comprises at least two spindles with a cable wound such that there is no net twist in the cable.

24. The system of claim 22, where the spindle means comprises at least two spindles with a cable wound such that there is no net torque on the spindle.

25. The system of claim 22, where the fiber spindling forms a knot.

26. The system of claim 25, where the knot is of the constrictor family.

27. The system of claim 22, where the spindle means includes a surface treatment for increasing friction between said cable and said spindle.

28. The system of claim 20, where the means of anchoring said cable to said structure includes at least one turn on a pin, retained with encapsulant.

29. A system for detecting structural failure comprising:
a means for anchoring a fiber optic cable to a structure such that the cable failure correlates with structural failure;
two or more cable segments, each segment coupled to a signal source and signal detector;
a means to operate user indicators and controllers along the structure; and
a means to provide electric power to each signal source and signal detector.

30. The system of claim 29, where the means for providing electric power is insufficiently sized to continuously power the user indicator and an energy storage means to sufficiently power the user indicator are located near each controller or user indicator.

31. The system of claim 29, where a means for monitoring the status of the energy storage means is coupled to maintenance services via the controllers.

32. The system of claim 29, where a means for monitoring the inclination of a structural component is provided by each controller.

33. A method for detecting a structural failure comprising:
providing a fiber optic cable attached to the structure such that the cable cannot slip past fixed points and the fiber optic cable will be parted by a structural failure; and
providing indication of a structural failure to a user of the structure.

34. The method of claim 33, where the cable cannot slip past a fixed point by more than 6 inches.

35. The method of claim 33, further comprising, providing a spindle to attach a cable to a fixed point.

36. The method of claim 33, further comprising, providing a spindle set suitable to:
take up any cable slack during installation;
provide a cable winding such that the spindles have no net torque;
provide a cable winding such that the cable has no net twist; or
provide friction between the spindle and the optical fiber adequate to break the fiber.

37. The method of claim 33, further comprising a knot placed on a spindle.

38. The method of claim 33, where the user indicator is operable by absence of an expected signal.

39. The method of claim 38, where the signal is comprised of data to operate diagnostic features or monitor the status of the user indicator.

40. The method of claim 33, where the energy storage is located near the user indicator sufficient to indicate failure to a user for at least 30 minutes and maximum electrical power input is slightly greater than quiescent power input.